

CLAIMS

1. A semiconductor device comprising:

a first transistor;

a second transistor;

5 a third transistor;

a first power source applying a first potential;

a second power source applying a second potential; and

a circuit for applying a third potential which is different from the first potential and the second potential;

10 wherein one of a source and a drain of the first transistor is connected to the first power source;

wherein the other of the source and the drain of the first transistor is connected to one of a source and a drain of the second transistor;

15 wherein the other of the source and the drain of the second transistor is connected to one of a source and a drain of the third transistor;

wherein the other of the source and the drain of the third transistor is connected to the second power source;

wherein a gate of the third transistor is connected to the circuit;

wherein a first signal is inputted to gates of the first transistor and the second transistor;

20 and

wherein a second signal is outputted from the other of the source and the drain of the first transistor and the one of the source and the drain of the second transistor.

2. The semiconductor device according to claim 1, wherein the first transistor is a
25 p-channel transistor, the second transistor is an n-channel transistor, and the third transistor is a p-channel transistor.

3. A semiconductor device comprising:

a first transistor;

30 a second transistor;

a third transistor;

a first power source applying a first potential;

a second power source applying a second potential; and

a circuit for generating a third potential which is different from the first potential and the

5 second potential;

wherein one of a source and a drain of the third transistor is connected to the first power source;

wherein the other of the source and the drain of the third transistor is connected to one of a source and a drain of the first transistor;

10 wherein the other of the source and the drain of the first transistor is connected to one of a source and a drain of the second transistor;

wherein the other of the source and the drain of the second transistor is connected to the second power source;

wherein a gate of the third transistor is connected to the circuit;

15 wherein a first signal is inputted to gates of the first transistor and the second transistor; and

wherein a second signal is outputted from the other of the source and the drain of the first transistor and the one of the source and the drain of the second transistor.

20 4. The semiconductor device according to claim 3, wherein the first transistor is a p-channel transistor, the second transistor is an n-channel transistor, and the third transistor is an n-channel transistor.

5. A semiconductor device comprising:

25 a first transistor;

a second transistor;

a third transistor;

a fourth transistor;

a first power source applying a first potential;

30 a second power source applying a second potential;

a first circuit for generating a third potential which is different from the first potential and the second potential; and

a second circuit for generating a fourth potential which is different from the first potential and the second potential;

5 wherein one of a source and a drain of the fourth transistor is connected to the first power source;

wherein the other of the source and the drain of the fourth transistor is connected to one of a source and a drain of the first transistor;

10 wherein the other of the source and the drain of the first transistor is connected to one of a source and a drain of the second transistor;

wherein the other of the source and the drain of the second transistor is connected to one of a source and a drain of the third transistor;

wherein the other of the source and the drain of the third transistor is connected to the second power source;

15 wherein a gate of the third transistor is connected to the first circuit;

wherein a gate of the fourth transistor is connected to the second circuit;

wherein a first signal is inputted to gates of the first transistor and the second transistor;

and

20 wherein a second signal is outputted from the other of the source and the drain of the first transistor and the one of the source and the drain of the second transistor.

6. The semiconductor device according to claim 5, wherein the first transistor is a p-channel transistor, the second transistor is an n-channel transistor, the third transistor is a p-channel transistor, and the fourth transistor is an n-channel transistor.

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7. A semiconductor device comprising:

a first transistor;

a second transistor;

a third transistor;

30 a fourth transistor;

a first power source applying a first potential;
a second power source applying a second potential; and
a circuit for generating a third potential which is different from the first potential and the second potential;

5 wherein one of a source and a drain of the first transistor and one of a source and a drain of the third transistor is connected to the first power source;

wherein the other of the source and the drain of the first transistor is connected to one of a source and a drain of the second transistor;

10 wherein the other of the source and the drain of the second transistor is connected to the second power source;

wherein a gate of the second transistor is connected to the other of the source and the drain of the third transistor and to one of a source and a drain of the fourth transistor;

wherein the other of the source and the drain of the fourth transistor is connected to the circuit;

15 wherein a first signal is inputted to gates of the first transistor, the third transistor and the fourth transistor; and

wherein a second signal is outputted from the other of the source and the drain of the first transistor and the one of the source and the drain of the second transistor.

20 8. The semiconductor device according to claim 7, wherein the first transistor is a p-channel transistor, the second transistor is a p-channel transistor, the third transistor is a p-channel transistor, and the fourth transistor is an n-channel transistor.

9. A semiconductor device comprising:

25 a first transistor;

a second transistor;

a third transistor;

a fourth transistor;

a first power source applying a first potential;

30 a second power source applying a second potential; and

a circuit for generating a third potential which is different from the first potential and the second potential;

wherein one of a source and a drain of the first transistor is connected to the first power source;

5 wherein the other of the source and the drain of the first transistor is connected to one of a source and a drain of the second transistor;

wherein the other of the source and the drain of the second transistor and one of a source and a drain of the third transistor is connected to the second power source;

10 wherein a gate of the first transistor is connected to the other of the source and the drain of the third transistor and to one of a source and a drain of the fourth transistor;

wherein the other of the source and the drain of the fourth transistor is connected to the circuit;

wherein a first signal is inputted to gates of the second transistor, the third transistor and the fourth transistor; and

15 wherein a second signal is outputted from the other of the source and the drain of the first transistor and the one of the source and the drain of the second transistor.

10. The semiconductor device according to claim 9, wherein the first transistor is an n-channel transistor, the second transistor is an n-channel transistor, the third transistor is an n-channel transistor, and the fourth transistor is a p-channel transistor.

11. A semiconductor device comprising:

a first transistor;

a second transistor;

25 a third transistor;

a fourth transistor;

a fifth transistor;

a sixth transistor;

a first power source applying a first potential;

30 a second power source applying a second potential;

a first circuit for generating a third potential which is different from the first potential and the second potential; and

a second circuit for generating a fourth potential which is different from the first potential and the second potential;

5 wherein one of a source and a drain of the first transistor and one of a source and a drain of the third transistor is connected to the first power source;

wherein the other of the source and the drain of the first transistor is connected to one of a source and a drain of the second transistor;

10 wherein the other of the source and the drain of the second transistor and one of a source and a drain of the fifth transistor is connected to the second power source;

wherein a gate of the second transistor is connected to the other of the source and the drain of the third transistor and to one of a source and a drain of the fourth transistor;

wherein the other of the source and the drain of the fourth transistor is connected to the first circuit;

15 wherein a gate of the first transistor is connected to the other of the source and the drain of the fifth transistor and to one of a source and a drain of the sixth transistor;

wherein the other of the source and the drain of the sixth transistor is connected to the second circuit;

20 wherein a first signal is inputted to gates of the third transistor, the fourth transistor, the fifth transistor, and the sixth transistor; and

wherein a second signal is outputted from the other of the source and the drain of the first transistor and the one of the source and the drain of the second transistor.

12. The semiconductor device according to claim 11, wherein the first transistor is an
25 n-channel transistor, the second transistor is a p-channel transistor, the third transistor is a p-channel transistor, the fourth transistor is an n-channel transistor, the fifth transistor is an n-channel transistor, and the sixth transistor is a p-channel transistor.

13. A semiconductor device comprising:

30 a first transistor;

a second transistor;

a first power source applying a first potential;

a second power source applying a second potential; and

a circuit including one third transistor or multiple third transistors connected in series;

5 wherein one of a source and a drain of the first transistor is connected to the first power source;

wherein the other of the source and the drain of the first transistor is connected to one of a source and a drain of the second transistor;

10 wherein the other of the source and the drain of the second transistor is connected to one terminal of the circuit;

wherein the other terminal of the circuit is connected to the second power source;

wherein a gate of the third transistor is connected to a drain thereof;

wherein a first signal is inputted to gates of the first transistor and the second transistor;

and

15 wherein a second signal is outputted from the other of the source and the drain of the first transistor and the one of the source and the drain of the second transistor.

14. The semiconductor device according to claim 13, wherein the first transistor is a p-channel transistor, the second transistor is an n-channel transistor, and the third transistor is an n-channel transistor.

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15. A semiconductor device comprising:

a first transistor;

a second transistor;

25 a first power source applying a first potential;

a second power source applying a second potential; and

a circuit including one third transistor or multiple third transistors connected in series;

wherein one terminal of the circuit is connected to the first power source;

30 wherein the other terminal of the circuit is connected to one of a source and a drain of the first transistor;

wherein the other of the source and the drain of the first transistor is connected to one of a source and a drain of the second transistor;

wherein the other of the source and the drain of the second transistor is connected to the second power source;

5 wherein a gate of the third transistor is connected to a drain thereof;

wherein a first signal is inputted to gates of the first transistor and the second transistor;
and

wherein a second signal is outputted from the other of the source and the drain of the first transistor and the one of the source and the drain of the second transistor.

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16. The semiconductor device according to claim 15, wherein the first transistor is a p-channel transistor, the second transistor is an n-channel transistor, and the third transistor is a p-channel transistor.

15 17. A semiconductor device comprising:

a first transistor;

a second transistor;

a first power source applying a first potential;

a second power source applying a second potential;

20 a first circuit including one third transistor or multiple third transistors connected in series; and

a second circuit including one fourth transistor or multiple fourth transistors connected in series;

wherein one terminal of the second circuit is connected to the first power source;

25 wherein the other terminal of the second circuit is connected to one of a source and a drain of the first transistor;

wherein the other of the source and the drain of the first transistor is connected to one of a source and a drain of the second transistor;

30 wherein the other of the source and the drain of the second transistor is connected to one terminal of the first circuit;

wherein the other terminal of the first circuit is connected to the second power source;
 wherein a gate of the third transistor is connected to a drain thereof;
 wherein a gate of the fourth transistor is connected to a drain thereof;
 wherein a first signal is inputted to gates of the first transistor and the second transistor:

5 and

wherein a second signal is outputted from the other of the source and the drain of the first transistor and the one of the source and the drain of the second transistor.

18. The semiconductor device according to claim 17, wherein the first transistor is a
 10 p-channel transistor, the second transistor is an n-channel transistor, the third transistor is an n-channel transistor, and the fourth transistor is a p-channel transistor.

19. The semiconductor device according to any one of claims 1, 3, 7 and 9, wherein the circuit includes multiple resistors connected in series;

15 wherein one end of the multiple resistors is connected to the first power source;

wherein the other end of the multiple resistors is connected to the second power source;

and

wherein a potential is outputted from a connecting node of two resistors that are selected from among the multiple resistors.

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20. The semiconductor device according to any one of claims 5 and 11, wherein each of the first circuit and the second circuit include multiple resistors connected in series;

wherein one end of the multiple resistors is connected to the first power source;

wherein the other end of the multiple resistors is connected to the second power source;

25 and

wherein a potential is outputted from a connecting node of two resistors that are selected from among the multiple resistors.

21. An electronic appliance using the semiconductor device according to any one of
 30 claims 1, 3, 5, 7, 9, 11, 13, 15 and 17.